wherein (σ_{ri}) is stress in said i-th insulating film and is positive when tensile stress and negative when compressive stress.

REMARKS

A petition for a two month extension of time has today been filed as a separate paper and a copy is attached hereto.

As taught at page 16, line 20, to page 17, line 1 of applicants' original specification (page 22, line 9 to page 23, line 4 of the substitute specification), applicants have found experimentally that, in order to avoid cracking where the insulating film is formed on an aluminum film, total stress in the insulating layers should be less than 2×10^5 dyne/cm.

Claims 49-52 drawn to the "non-elected invention" have been cancelled.

Responsive to paragraph 4 of the office action, claim 46 has been amended to delete "predetermined" and, responsive to paragraph 6, claim 46 has been further amended to provide the antecedent basis in question.

Claim 48 has been cancelled. To the extent that the rejection for obviousness set forth in paragraph 8 of the office action might be deemed applicable to amended claims 43, 44, 45 and 47, it is respectfully traversed. Although Matsuura discloses "metal conductor 12" in the

embodiment of Figs. 5a and 5b, and teach stress migration therein at column 7, lines 6 and 7, Matsuura et al in no way suggest any critical stress, much less a critical stress less than 2×10^5 dyne/cm. Likewise, the so-called "applicants' admitted prior art" is not suggestive of any critical stress for insulating layers to insure integrity of an aluminum interlayer. Accordingly, it is respectfully submitted that no combination of the applicant admitted prior art and Matsuura is suggestive of a critical value for total stress in insulating layers contacting an aluminum interconnection layer.

Likewise, the rejection of claim 46 for obviousness, as set forth in paragraph 9 of the office action is traversed. The additional citation of Harriott in no way supplements the relevance of the combination of the other two references or, lack of relevance thereof, with respect to a threshold value for total stress of insulating layers in contact with an aluminum interconnection layer. Harriott is directed to the fabrication of mask to be used in a lithographic process. It is respectfully submitted that one skilled in the art would not look to Harriott for modification of the teachings of either "applicants' admitted prior art" or Matsuura, neither of which have anything to do with lithographic mask. Further, Harriott is unrelated to any problem of stress in insulating layers combined with an aluminum interconnection layer.

In conclusion, it is respectfully requested that the examiner reconsider the rejections of record in view of the present amendments and foregoing comments.

Respectfully submitted,

George A. Loud
Reg. No. 25,814

Dated: November 19, 2001

LORUSSO & LOUD
3137 Mount Vernon Avenue
Alexandria, VA 22305

(703) 739-9393

43. (Amended) A stress-adjusted insulating film forming method for forming a multilayered insulating film on a substrate, said method comprising:

(a) forming a first insulating layer with a first type of stress;

(b) forming an aluminum [a conductive] interconnection layer on and in contact with said first insulating layer;

(c) forming a second insulating layer with said first type of stress on and in contact with said interconnection layer;

wherein said interconnection layer is sandwiched between and in contact with said first insulating layer and said second insulating layer and wherein the total stress in said insulating layers is limited to less than 2×10^5 dyne/cm so as to suppress bending of said interconnection layer.

44. (Amended) A method according to claim 43, further comprising:

(d) before forming said first insulating layer or after forming said second insulating layer, forming a third insulating layer [film] with a second type of stress that is different from said first type of stress, so as to adjust overall stress of said stress-adjusted insulating film.

46. (Amended) A method according to claim 45, wherein the stress-adjusted insulating film has first through i-th insulating layers having the thickness t_1 through t_i, respectively, and wherein the thickness (t_i) of i-th insulating layer [film] of said stress-adjusted film is determined so as not to exceed [predetermined] stress (σ_T) of said overall stress-adjusted insulating film where said stress (σ_T) is calculated as:

$$\sigma_T = \sum_{i=1}^{n} (t_i X \sigma_i)$$

wherein (σ_T) is stress in said i-th insulating film and is positive when tensile stress and negative when compressive stress.